

Claims:

1. A tree-structured document transmitting and receiving system having a tree-structured document transmitting apparatus and a tree-structured document receiving apparatus,
5 said tree-structured document transmitting apparatus having:

tree-structured document storage means of storing a plurality of tree-structured documents;

10 node priority presentation means of presenting a node priority which is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to
15 or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree;

node stream generation means of reading out a tree-structured document to be
20 transmitted from the tree-structured document storage means and generating a node stream in which nodes and/or subtrees are arranged in a sequence on the basis of node priorities presented by said node priority presentation means; and

transmitting means of converting said node stream into a signal based on a
25 predetermined network protocol and transmitting the signal, said tree-structured document receiving apparatus having:

receiving means of restoring the node stream from the signal received by said
predetermined network protocol from said transmitting means;

30 extraction means of extracting the nodes and/or subtrees from the node stream restored by said receiving means according to the sequence of arrangement in the node stream;

reconstruction means of adding the nodes and/or subtree in the extraction order to the
35 tree-structured document under reconstruction; and

display means of displaying the tree-structured document in the current reconstructed state.

2. The tree-structured document transmitting and receiving system according to Claim 1,
5 wherein said tree-structured document transmitting apparatus further has:

descendant substitute display information storage means of storing descendant
substitute display information for substitute display on said display means of said
tree-structured document receiving apparatus for descendant nodes with respect to a
10 node and/or a subtree existing as a parent of the descendant node; and

descendant substitute display information addition means of making the node stream
generation means generate as said node stream a stream in which the descendant
substitute display information read out from said descendant substitute display
15 information storage means is added immediately after the node and/or subtree existing
as a parent of the descendant node, and

wherein, in said tree-structured document receiving apparatus, said extraction means
extracts the nodes and/or subtrees and the descendant substitute display information
20 from the node stream restored by said receiving means according to the sequence of
arrangement in the node stream; and

said reconstruction means adds a substitute structure portion relating to the descendant
substitute display information to the tree structure under reconstruction in place of the
25 descendant node relating to the descendant substitute display information when said
extraction means extracts the descendant substitute display information.

3. The tree-structured document transmitting and receiving system according to Claim 2,
wherein, in said tree-structured document receiving apparatus, said reconstruction
30 means immediately replaces the substitute tree-structured portion relating to the
descendant substitute display information in the tree structure under reconstruction
with the descendant node when said extraction means extracts the descendant node
while substitute display for the descendant node according to the descendant substitute
display information is being performed.

4. The tree-structured document transmitting and receiving system according to Claim 1,
wherein said tree-structured document transmitting apparatus further has node priority
setting means of determining the importance of an information portion to be presented
from each node to the receiving-side user on the basis of a content of the node, an
attribute of the node, a content of the document, an attribute of the document, the tree
structure, a user instruction from a transmitting-side user, and/or a user instruction
from the receiving-side user, and setting a node priority on the basis of the
determination, and

10 wherein, in said tree-structured document transmitting apparatus, said node priority
presentation means presents the node priority set by said node priority setting means.

5. A tree-structured document transmitting and receiving system having a tree-structured
document transmitting apparatus and a tree-structured document receiving apparatus,
said tree-structured document transmitting apparatus having:

tree-structured document storage means of storing a plurality of tree-structured
documents;

20 a plurality of document-by-document encoding means each assigned processing of one
tree-structured document in a plurality of tree-structured documents to be transmitted,
and each having node priority presentation means and node stream generation means,
said node priority presentation means presenting a node priority which is set with
respect to each of nodes of said assigned tree-structured document on the basis of the
importance of an information portion to be presented from the node to a receiving-side
user while satisfying two conditions: a first condition that the node priority of the node
is equal to or lower than that of a node which is an ancestor of that node, and a second
condition that if a plurality of nodes of the same priority exist, the nodes necessarily
constitute one subtree, said node stream generation means reading out a tree-structured
document to be transmitted from the tree-structured document storage means and
generating a node stream in which nodes and/or subtrees are arranged in a sequence on
the basis of node priorities presented by said node priority presentation means;

35 inter-document priority presentation means of presenting inter-document priorities set
as transmission priorities with respect to the plurality of tree-structured documents to

be transmitted;

5 multiplexed stream generation means of generating one multiplexed stream by multiplexing the node streams from said document-by-document encoding means, sequences in which the nodes and/or subtrees of the tree-structured documents are arranged being placed in the multiplexed stream according to the inter-document priorities presented by said inter-document priority presentation means with respect to the tree-structured documents containing the nodes and/or subtrees; and

10 transmitting means of transmitting said multiplexed stream by converting said multiplexed stream on the basis of a predetermined network protocol, said tree-structured document receiving apparatus having:

15 receiving means of restoring the multiplexed stream from the signal received by said predetermined network protocol from said transmitting means;

demultiplexing means of demultiplexing the multiplexed stream into the plurality of node streams contained in the multiplexed stream;

20 a plurality of document-by-document decoding means each assigned processing of one node stream in the plurality of node streams demultiplexed by said demultiplexing means, and each including extraction means and reconstruction means, said extraction means extracting the nodes and/or subtrees from said processing-assigned node stream according to the sequence of arrangement in the node stream, said reconstruction
25 means adding the nodes and/or subtree in the extraction order to the tree-structured document under reconstruction; and

30 display means of displaying the tree-structured document under reconstruction in each document-by-document decoding means, the tree structure being displayed in the current reconstructed state at a corresponding position.

6. The tree-structured document transmitting and receiving system according to Claim 5, wherein, in said tree-structured document transmitting apparatus, said document-by-document encoding means further includes:

descendant substitute display information storage means of storing descendant substitute display information for substitute display on said display means of said tree-structured document receiving apparatus for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node; and

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descendant substitute display information addition means of making the node stream generation means generate as said node stream a stream in which the descendant substitute display information read out from said descendant substitute display information storage means is added immediately after the node and/or subtree existing as a parent of the descendant node, and

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wherein, in each document-by-document decoding means of said tree-structured document receiving apparatus, said extraction means extracts the nodes and/or subtrees and the descendant substitute display information from the node stream restored by said receiving means according to the sequence of arrangement in the node stream; and

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said reconstruction means adds a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in place of the descendant node relating to the descendant substitute display information when said extraction means extracts the descendant substitute display information.

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7. The tree-structured document transmitting and receiving system according to Claim 6, wherein, in each document-by-document decoding means of said tree-structured document receiving apparatus, said reconstruction means immediately replaces the substitute tree-structured portion relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when said extraction means extracts the descendant node while substitute display for the descendant node according to the descendant substitute display information is being performed.

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8. The tree-structured document transmitting and receiving system according to Claim 5, wherein the multiplexed stream generation means of said tree-structured document transmitting apparatus further has node priority setting means of determining the importance of an information portion to be presented from each node to the receiving-side user on the basis of a content of the node, an attribute of the node, a

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content of the document, an attribute of the document, the tree structure, and/or a user instruction, and setting a node priority on the basis of the determination, and

5 wherein, in the multiplexed stream generation means of said tree-structured document transmitting apparatus, said node priority presentation means presents the node priority set by said node priority setting means.

9. The tree-structured document transmitting and receiving system according to Claim 5, wherein said tree-structured document transmitting apparatus further has
- 10 inter-document priority setting means of setting inter-document priorities on the basis of the contents of the documents, the attributes of the documents, the degrees of relation with a search word relating to a search request from the receiving-side user, a user instruction from a transmitting-side user, and/or a user instruction from the receiving-side user, and

15 wherein, in said tree-structured document transmitting apparatus, said inter-document priority presentation means presents the inter-document priorities set by said inter-document priority setting means.

- 20 10. A tree-structured document transmitting apparatus having:

tree-structured document storage means of storing a plurality of tree-structured documents;

25 node priority presentation means of presenting a node priority which is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute

30 one subtree;

node stream generation means of reading out a tree-structured document to be transmitted from the tree-structured document storage means and generating a node stream in which nodes and/or subtrees are arranged in a sequence on the basis of node

35 priorities presented by said node priority presentation means; and

transmitting means of converting said node stream into a signal based on a predetermined network protocol and transmitting the signal.

- 5 11. The tree-structured document transmitting apparatus according to Claim 10, further having:

10 descendant substitute display information storage means of storing descendant substitute display information for substitute display on said display means of said tree-structured document receiving apparatus for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node; and

15 descendant substitute display information addition means of making the node stream generation means generate as said node stream a stream in which the descendant substitute display information read out from said descendant substitute display information storage means is added immediately after the node and/or subtree existing as a parent of the descendant node.

- 20 12. The tree-structured document transmitting apparatus according to Claim 10, further having:

25 node priority setting means of determining the importance of an information portion to be presented from each node to a receiving-side user on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, a user instruction from a transmitting-side user, and/or a user instruction from the receiving-side user, and setting a node priority on the basis of the determination,

30 wherein said node priority presentation means presents the node priority set by said node priority setting means.

- 35 13. A tree-structured document receiving apparatus which receives a signal formed by converting on the basis of a predetermined network protocol a node stream formed in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be

presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; and nodes and/or subtrees are arranged in a sequence on the basis of the node priorities, said tree-structured document receiving apparatus having:

receiving means of restoring the node stream from the signal received by the predetermined network protocol;

extraction means of extracting the nodes and/or subtrees from the node stream restored by said receiving means according to the sequence of arrangement in the node stream;

reconstruction means of adding the nodes and/or subtree in the extraction order to the tree-structured document under reconstruction; and

display means of displaying the tree-structured document in the current reconstructed state.

14. The tree-structured document receiving apparatus according to Claim 13, wherein, in the node stream restored by said receiving means, descendant substitute display information for substitute display on said display means for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node;

said extraction means extracts the nodes and/or subtrees and the descendant substitute display information from the node stream restored by said receiving means according to the sequence of arrangement in the node stream; and

said reconstruction means adds a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in place of the descendant node relating to the descendant substitute display information when said extraction means extracts the descendant substitute display information.

15. The tree-structured document receiving apparatus according to Claim 14, wherein said reconstruction means immediately replaces the substitute tree-structured portion

relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when said extraction means extracts the descendant node while substitute display for the descendant node according to the descendant substitute display information is being performed.

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16. A tree-structured document transmitting apparatus having:

tree-structured document storage means of storing a plurality of tree-structured documents;

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a plurality of document-by-document encoding means each assigned processing of one tree-structured document in a plurality of tree-structured documents to be transmitted, and each having node priority presentation means and node stream generation means, said node priority presentation means presenting a node priority which is set with respect to each of nodes of said assigned tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree, said node stream generation means reading out a tree-structured document to be transmitted from the tree-structured document storage means and generating a node stream in which nodes and/or subtrees are arranged in a sequence on the basis of node priorities presented by said node priority presentation means;

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inter-document priority presentation means of presenting inter-document priorities set as transmission priorities with respect to the plurality of tree-structured documents to be transmitted;

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multiplexed stream generation means of generating one multiplexed stream by multiplexing the node streams from said document-by-document encoding means, sequences in which the nodes and/or subtrees of the tree-structured documents are arranged being placed in the multiplexed stream according to the inter-document priorities presented by said inter-document priority presentation means with respect to the tree-structured documents containing the nodes and/or subtrees; and

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transmitting means of transmitting said multiplexed stream by converting said multiplexed stream on the basis of a predetermined network protocol.

17. The tree-structured document transmitting apparatus according to Claim 16, wherein said document-by-document encoding means further includes:

descendant substitute display information storage means of storing descendant substitute display information for substitute display on said display means of said tree-structured document receiving apparatus for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node; and

descendant substitute display information addition means of making the node stream generation means generate as said node stream a stream in which the descendant substitute display information read out from said descendant substitute display information storage means is added immediately after the node and/or subtree existing as a parent of the descendant node.

18. The tree-structured document transmitting apparatus according to Claim 16, wherein the multiplexed stream generation means of said tree-structured document transmitting apparatus further has node priority setting means of determining the importance of an information portion to be presented from each node to the receiving-side user on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, and/or a user instruction, and setting a node priority on the basis of the determination, and

wherein, in the multiplexed stream generation means of said tree-structured document transmitting apparatus, said node priority presentation means presents the node priority set by said node priority setting means.

19. The tree-structured document transmitting apparatus according to Claim 16, further having inter-document priority setting means of setting inter-document priorities on the basis of the contents of the documents, the attributes of the documents, the degrees of relation with a search word relating to a search request from the receiving-side user, a user instruction from a transmitting-side user, and/or a user instruction from the receiving-side user,

wherein said inter-document priority presentation means presents the inter-document priorities set by said inter-document priority setting means.

- 5 20. A tree-structured document receiving apparatus which receives a signal formed by
converting on the basis of a predetermined network protocol a multiplexed stream
formed in such a manner that a node priority is set with respect to each of nodes of a
tree-structured document on the basis of the importance of an information portion to be
10 presented from the node to a receiving-side user while satisfying two conditions: a first
condition that the node priority of the node is equal to or lower than that of a node
which is an ancestor of that node, and a second condition that if a plurality of nodes of
the same priority exist, the nodes necessarily constitute one subtree; node streams are
formed in each of which, with respect to one of a plurality of tree-structured documents
15 to be presently transmitted, nodes and/or subtrees are arranged in a sequence on the
basis of the node priorities related to the tree-structured document; and the multiplexed
stream is formed by multiplexing the node streams relating to the tree-structured
documents to be presently transmitted, sequences in which the nodes and/or subtrees of
the tree-structured documents are arranged being placed in the multiplexed stream
20 according to inter-document priorities set with respect to the tree-structured documents
containing the nodes and/or subtrees, said tree-structured document receiving apparatus
having:

receiving means of restoring the multiplexed stream from the signal received by the
predetermined network protocol;

demultiplexing means of demultiplexing the multiplexed stream into the plurality of
node streams contained in the multiplexed stream;

a plurality of document-by-document decoding means each assigned processing of one
node stream in the plurality of node streams demultiplexed by said demultiplexing
means, and each including extraction means and reconstruction means, said extraction
means extracting the nodes and/or subtrees from said processing-assigned node stream
according to the sequence of arrangement in the node stream, said reconstruction
means adding the nodes and/or subtree in the extraction order to the tree-structured
35 document under reconstruction; and

display means of displaying the tree-structured document under reconstruction in each document-by-document decoding means, the tree structure being displayed in the current reconstructed state at a corresponding position.

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21. The tree-structured document receiving apparatus according to Claim 20, wherein, in the node stream, descendant substitute display information for substitute display on said display means for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node;

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said extraction means in said document-by-document decoding means extracts the nodes and/or subtrees and the descendant substitute display information from the node stream according to the sequence of arrangement in the node stream; and

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said reconstruction means in said document-by-document decoding means adds a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in place of the descendant node relating to the descendant substitute display information when said extraction means extracts the descendant substitute display information.

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22. The tree-structured document receiving apparatus according to Claim 21, wherein said reconstruction means in said document-by-document decoding means immediately replaces the substitute tree-structured portion relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when said extraction means extracts the descendant node while substitute display for the descendant node according to the descendant substitute display information is being performed.

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23. A tree-structured document transmitting and receiving method having a tree-structured document transmitting method and a tree-structured document receiving method, said tree-structured document transmitting method having:

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a node stream generation step of generating a node stream in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis

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of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; a tree-structured document to be transmitted is read out from tree-structured document storage means; and nodes and/or subtrees of the tree-structured document are arranged in a sequence on the basis of said node priorities; and

a transmitting step of converting said node stream into a signal based on a predetermined network protocol and transmitting the signal, said tree-structured document receiving method having:

a receiving step of restoring the node stream from the signal received by said predetermined network protocol;

an extraction step of extracting the nodes and/or subtrees from the node stream restored in said receiving step according to the sequence of arrangement in the node stream;

a reconstruction step of adding the extracted nodes and/or subtree in the extraction order to the tree-structured document under reconstruction; and

a display step of displaying on the display means the tree-structured document in the current reconstructed state.

24. The tree-structured document transmitting and receiving method according to Claim 23, wherein said tree-structured document transmitting method further has: a descendant substitute display information addition step of generating, in the node stream generation step, as said node stream, a node stream in which descendant substitute display information for substitute display on display means on the receiving side for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node, and

wherein, in said tree-structured document receiving method, said extraction step

comprises extracting the nodes and/or subtrees and the descendant substitute display information from the node stream restored in said receiving step according to the sequence of arrangement in the node stream; and

5 said reconstruction step comprises adding a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in place of the descendant node relating to the descendant substitute display information when the descendant substitute display information is extracted in said extraction step.

10 25. The tree-structured document transmitting and receiving method according to Claim 24, wherein, in said tree-structured document receiving method, said reconstruction step comprises immediately replacing the substitute tree-structured portion relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when the descendant node is extracted in said extraction step
15 while substitute display for the descendant node according to the descendant substitute display information is being performed.

20 26. The tree-structured document transmitting and receiving method according to Claim 23, wherein said tree-structured document transmitting method has a node priority setting step of setting node priorities used in the node stream generation step, and
25 wherein, in said node priority setting step, the importance of an information portion to be presented from each node to the receiving-side user is determined on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, a user instruction from a transmitting-side user, and/or
30 a user instruction from the receiving-side user, and a node priority is set on the basis of the determination.

30 27. A tree-structured document transmitting and receiving method having a tree-structured document transmitting method and a tree-structured document receiving method, said tree-structured document transmitting method having:

35 a plurality of document-by-document encoding steps each assigned processing of one tree-structured document in a plurality of tree-structured documents to be transmitted, and each including a node stream generation substep comprising generating a node

stream in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node
5 which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; one assigned tree-structured document is read out from tree-structured document storage means; and nodes and/or subtrees of the tree-structured document are arranged in a sequence on the basis of said node priorities;
10 a multiplexed stream generation step of generating one multiplexed stream by multiplexing the node streams in said document-by-document encoding steps, inter-document priorities being set as transmission priorities with respect to the plurality of tree-structured documents to be transmitted, sequences in which the nodes and/or subtrees of the tree-structured documents are arranged being placed in the
15 multiplexed stream according to the inter-document priorities with respect to the tree-structured documents; and

a transmitting step of transmitting said multiplexed stream by converting said multiplexed stream on the basis of a predetermined network protocol, said
20 tree-structured document receiving method having:

a receiving step of restoring the multiplexed stream from the signal received by the predetermined network protocol;

25 a demultiplexing step of demultiplexing the multiplexed stream into the plurality of node streams contained in the multiplexed stream;

a plurality of document-by-document decoding steps each assigned processing of one node stream in the plurality of node streams demultiplexed in said demultiplexing step,
30 and each including an extraction substep and a reconstruction substep, said extraction substep comprising extracting the nodes and/or subtrees from said processing-assigned node stream according to the sequence of arrangement in the node stream, said reconstruction substep comprising adding the nodes and/or subtree extracted in said extraction substep in the extraction order to the tree-structured document under
35 reconstruction; and

a display step of displaying the tree-structured document under reconstruction in each document-by-document decoding step, the tree structure being displayed in the current reconstructed state at a corresponding position of the display means.

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28. The tree-structured document transmitting and receiving method according to Claim 27, wherein, in said tree-structured document transmitting method, said document-by-document encoding step further includes:

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a descendant substitute display information addition substep of generating, in the node stream generation step, as said node stream, a node stream in which descendant substitute display information for substitute display on display means on the receiving side for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node, and

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wherein, in said tree-structured document receiving method, said extraction substep in each document-by-document decoding step comprises extracting the nodes and/or subtrees and the descendant substitute display information from the node stream restored in said receiving step according to the sequence of arrangement in the node stream; and

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said reconstruction substep in each document-by-document decoding step of said tree-structured document receiving method comprises adding a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in place of the descendant node relating to the descendant substitute display information when the descendant substitute display information is extracted in said extraction substep.

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29. The tree-structured document transmitting and receiving method according to Claim 28, wherein, in said tree-structured document receiving method, said reconstruction substep in each document-by-document decoding step comprises immediately replacing the substitute tree-structured portion relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when the descendant node is extracted in said extraction substep while substitute

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display for the descendant node according to the descendant substitute display information is being performed.

30. The tree-structured document transmitting and receiving method according to Claim 27, wherein the multiplexed stream generation step of said tree-structured document transmitting method includes a node priority setting substep of setting node priorities used in the node stream generation substep, and

wherein, in said node priority setting substep, the importance of an information portion to be presented from each node to the receiving-side user is determined on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, and/or a user instruction, and a node priority is set on the basis of the determination.

31. The tree-structured document transmitting and receiving method according to Claim 27, wherein said tree-structured document transmitting method further has an inter-document priority setting step of setting inter-document priorities on the basis of the contents of the documents, the attributes of the documents, the degrees of relation with a search word relating to a search request from the receiving-side user, a user instruction from a transmitting-side user, and/or a user instruction from the receiving-side user, and

wherein, in said tree-structured document transmitting method, said multiplexed stream generation step comprises restoring the multiplexed stream on the basis of the inter-document priorities set in said inter-document priority setting step.

32. A tree-structured document transmitting method having:

a plurality of document-by-document encoding steps each assigned processing of one tree-structured document in a plurality of tree-structured documents to be transmitted, and each including a node stream generation substep comprising generating a node stream in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node

which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; one assigned tree-structured document is read out from tree-structured document storage means; and nodes and/or subtrees of the tree-structured document are arranged in a sequence on the basis of said node priorities;

a multiplexed stream generation step of generating one multiplexed stream by multiplexing the node streams in said document-by-document encoding steps, inter-document priorities being set as transmission priorities with respect to the plurality of tree-structured documents to be transmitted, sequences in which the nodes and/or subtrees of the tree-structured documents are arranged being placed in the multiplexed stream according to the inter-document priorities with respect to the tree-structured documents; and

a transmitting step of transmitting said multiplexed stream by converting said multiplexed stream on the basis of a predetermined network protocol.

33. The tree-structured document transmitting method, wherein the node stream generation substep in said document-by-document encoding step includes a descendant substitute display information addition substep of generating, in the node stream generation step, as said node stream, a stream in which descendant substitute display information for substitute display on display means on the receiving side for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node.

34. The tree-structured document transmitting method according to Claim 32, wherein said multiplexed stream generation step includes a node priority setting substep of setting node priorities used in the node stream generation substep, and

wherein, in said node priority setting substep, the importance of an information portion to be presented from each node to the receiving-side user is determined on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, and/or a user instruction, and a node priority is set on the basis of the determination.

35. A tree-structured document receiving method of receiving a signal formed by converting on the basis of a predetermined network protocol a node stream formed in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; and nodes and/or subtrees are arranged in a sequence on the basis of the node priorities, said tree-structured document receiving method having:
- a receiving step of restoring the node stream from the signal received by the predetermined network protocol;
- an extraction step of extracting the nodes and/or subtrees from the node stream restored in said receiving step according to the sequence of arrangement in the node stream;
- a reconstruction step of adding the extracted nodes and/or subtree in the extraction order to the tree-structured document under reconstruction; and
- a display step of displaying the tree-structured document in the current reconstructed state.
36. The tree-structured document receiving method according to Claim 35, wherein, in the node stream restored in said receiving step, descendant substitute display information for substitute display on said display means for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node;
- said extraction step comprises extracting the nodes and/or subtrees and the descendant substitute display information from the node stream restored in said receiving step according to the sequence of arrangement in the node stream; and
- said reconstruction step comprises adding a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in

place of the descendant node relating to the descendant substitute display information when the descendant substitute display information is extracted in said extraction step.

37. The tree-structured document receiving method according to Claim 36, wherein said reconstruction step comprises immediately replacing the substitute tree-structured portion relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when the descendant node is extracted in said extraction step while substitute display for the descendant node according to the descendant substitute display information is being performed.

38. A tree-structured document transmitting method having:

a plurality of document-by-document encoding steps each assigned processing of one tree-structured document in a plurality of tree-structured documents to be transmitted, and each including a node stream generation substep comprising generating a node stream in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; one assigned tree-structured document is read out from tree-structured document storage means; and nodes and/or subtrees of the tree-structured document are arranged in a sequence on the basis of said node priorities;

a multiplexed stream generation step of generating one multiplexed stream by multiplexing the node streams in said document-by-document encoding steps, inter-document priorities being set as transmission priorities with respect to the plurality of tree-structured documents to be transmitted, sequences in which the nodes and/or subtrees of the tree-structured documents are arranged being placed in the multiplexed stream according to the inter-document priorities with respect to the tree-structured documents; and

a transmitting step of transmitting said multiplexed stream by converting said multiplexed stream on the basis of a predetermined network protocol.

39. The tree-structured document transmitting method according to Claim 38, wherein said document-by-document encoding step further includes a descendant substitute display information addition substep of generating, in the node stream generation step, as said node stream, a stream in which descendant substitute display information for substitute display on display means on the receiving side for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node.

40. The tree-structured document transmitting method according to Claim 38, wherein said multiplexed stream generation step further includes a node priority setting substep of determining the importance of an information portion to be presented from each node to the receiving-side user on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, and/or a user instruction, and setting a node priority on the basis of the determination,

wherein the multiplexed stream generation step of said tree-structured document transmitting method includes a node priority setting substep of setting node priorities used in the node stream generation substep, and

wherein, in said node priority setting substep, the importance of an information portion to be presented from each node to the receiving-side user is determined on the basis of a content of the node, an attribute of the node, a content of the document, an attribute of the document, the tree structure, and/or a user instruction, and a node priority is set on the basis of the determination.

41. The tree-structured document transmitting method according to Claim 38, further having an inter-document priority setting step of setting inter-document priorities on the basis of the contents of the documents, the attributes of the documents, the degrees of relation with a search word relating to a search request from the receiving-side user, a user instruction from a transmitting-side user, and/or a user instruction from the receiving-side user,

wherein said multiplexed stream generation step comprises restoring the multiplexed stream on the basis of the inter-document priorities set in the inter-document priority setting substep.

42. A tree-structured document receiving method of receiving a signal formed by converting on the basis of a predetermined network protocol a multiplexed stream formed in such a manner that a node priority is set with respect to each of nodes of a tree-structured document on the basis of the importance of an information portion to be presented from the node to a receiving-side user while satisfying two conditions: a first condition that the node priority of the node is equal to or lower than that of a node which is an ancestor of that node, and a second condition that if a plurality of nodes of the same priority exist, the nodes necessarily constitute one subtree; node streams are formed in each of which, with respect to one of a plurality of tree-structured documents to be presently transmitted, nodes and/or subtrees are arranged in a sequence on the basis of the node priorities related to the tree-structured document; and the multiplexed stream is formed by multiplexing the node streams relating to the tree-structured documents to be presently transmitted, sequences in which the nodes and/or subtrees of the tree-structured documents are arranged being placed in the multiplexed stream according to inter-document priorities set with respect to the tree-structured documents containing the nodes and/or subtrees, said tree-structured document receiving method having:
- a receiving step of restoring the multiplexed stream from the signal received by the predetermined network protocol;
- a demultiplexing step of demultiplexing the multiplexed stream into the plurality of node streams contained in the multiplexed stream;
- a plurality of document-by-document decoding step each assigned processing of one node stream in the plurality of node streams demultiplexed in said demultiplexing step, and each including an extraction substep and a reconstruction substep, said extraction substep comprising extracting the nodes and/or subtrees from said processing-assigned node stream according to the sequence of arrangement in the node stream, said reconstruction substep comprising adding the nodes and/or subtree extracted in said extraction substep in the extraction order to the tree-structured document under reconstruction; and
- a display step of displaying the tree-structured document under reconstruction in each

document-by-document decoding step, the tree structure being displayed in the current reconstructed state at a corresponding position of the display means.

5 43. The tree-structured document receiving method according to Claim 42, wherein, in the node stream, descendant substitute display information for substitute display on said display means for descendant nodes with respect to a node and/or a subtree existing as a parent of the descendant node is added immediately after the node and/or subtree existing as a parent of the descendant node;

10 said extraction substep in said document-by-document decoding step comprises extracting the nodes and/or subtrees and the descendant substitute display information from the node stream according to the sequence of arrangement in the node stream; and

15 said reconstruction substep in said document-by-document decoding step comprises adding a substitute structure portion relating to the descendant substitute display information to the tree structure under reconstruction in place of the descendant node relating to the descendant substitute display information when the descendant substitute display information is extracted in said extraction substep.

20 44. The tree-structured document receiving method according to Claim 43, wherein said reconstruction substep in said document-by-document decoding step comprises immediately replacing the substitute tree-structured portion relating to the descendant substitute display information in the tree structure under reconstruction with the descendant node when the descendant node is extracted in said extraction substep
25 while substitute display for the descendant node according to the descendant substitute display information is being performed.